

In the United States Court of Federal Claims

No. 12-303C

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HITKANSUT LLC, a Michigan)	Patent case; U.S. Patent No. 7,175,722
corporation, & ACCELEDYNE)	entitled “Methods and Apparatus for
TECHNOLOGIES, LTD., LLC, a)	Stress Relief Using Multiple Energy
Michigan corporation,)	Sources;” enablement challenge; 35
)	U.S.C. § 112, Paragraph 1 (2006);
)	<i>Wands</i> factors; dependent claim that
Plaintiffs,)	does not state a further limitation on the
)	independent claim upon which it depends;
v.)	35 U.S.C. § 112, Paragraph 4 (2006)
)	
UNITED STATES,)	
)	
)	
Defendant.)	
)	
*****)	

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OPINION AND ORDER¹

LETTOW, Judge.

¹Because this opinion and order might have contained confidential or proprietary information within the meaning of Rule 26(c)(1)(G) of the Rules of the Court of Federal Claims (“RCFC”) and the protective order entered in this case, it was initially filed under seal. The parties were requested to review this order and to provide proposed redactions of any confidential or proprietary information. No redactions were requested.

This patent case concerns a thermomagnetic processing method employed in research conducted by the government acting through Oak Ridge National Laboratory (“Oak Ridge” or “the government”) and by private entities through contractual Cooperative Research and Development Agreements (“CRADAs”) with the government. Plaintiffs Hitkansut LLC and AcceleDyne Technologies, Ltd. LLC (collectively, “Hitkansut”) allege that the United States, through Oak Ridge, infringed upon Claims 1, 2, 6, 7, 8, 11, and 14 of its patent, United States Patent No. 7,175,722 (“the ’722 patent”), entitled “Methods and Apparatus for Stress Relief Using Multiple Energy Sources.” Before the court is the government’s motion for summary judgment of invalidity pursuant to RCFC 56 with respect to Claims 1, 2, 6, and 11 of the ’722 patent. Def.’s Mot. for Summary Judgment of Invalidity of U.S. Patent No. 7,175,722 Pursuant to [35] U.S.C. § 112 (“Def.’s Mot.”), ECF No. 80. Plaintiffs resist this motion and defend the validity of the claims in the ’722 patent. *See* Pls.’ Opp’n to Mot. for Summary Judgment of Invalidity of U.S. Patent No. 7,175,722 Pursuant to 35 U.S.C. § 112 (“Pls.’ Opp’n”), ECF No. 91. The pending motion represents the second motion by the government for partial summary judgment in this case; the court previously granted summary judgment to the government invalidating Claims 7, 8, and 14 of the ’722 patent for failure to claim patent eligible subject matter under 35 U.S.C. § 101. *Hitkansut LLC v. United States*, 115 Fed. Cl. 719 (2014) (“*Hitkansut II*”). The pending motion has been fully briefed, and a hearing was conducted on November 10, 2014.

BACKGROUND

Hitkansut claims that its principal, Ms. Donna Walker, invented “a method of achieving a desired physical property in a structure . . . through the concurrent application of two different energies . . . [where t]he first energy may be thermal energy (*i.e.* heat) and the second energy may be mechanical vibration, sonic, laser, microwave, or magnetic energy.” Pls.’ Mot. to Compel & for Entry of a Protective Order at 1-2, ECF No. 11. Ms. Walker filed a provisional patent application for this material-processing method on August 16, 2002 and was granted a patent on February 13, 2007. Hitkansut avers that Oak Ridge and its contractual partners are using the method and therefore infringing the process outlined in the claims of the ’722 patent. *See* Compl. ¶¶ 22, 45 & Ex. A.²

The ’722 patent consists of fourteen claims, seven of which are the subject of this action. In May 2013, this court held a claim-construction hearing, and it issued its constructions of the pertinent claim terms on July 31, 2013. *See Hitkansut II*, 114 Fed. Cl. 410. In September 2013, the government filed its first motion for summary judgment, asserting the invalidity of the ’722 patent because its claims sought to patent nonstatutory subject matter under 35 U.S.C. § 101. Hitkansut cross moved for a declaration that the claims are eligible for patent protection. On May 2, 2014, the court issued an opinion and order invalidating Claims 7, 8, and 14 for failure to claim patent eligible subject matter under 35 U.S.C. § 101. *See Hitkansut III*, 115 Fed. Cl. 719.

²Hitkansut claims that Ms. Walker disclosed her process to Oak Ridge employees while serving as a guest researcher there from 2003 to 2005, and Oak Ridge proceeded to use the process after discussing but failing to reach an agreement with Ms. Walker regarding a collaborative research effort. *See Hitkansut LLC v. United States*, 114 Fed. Cl. 410, 415 (2013) (construing disputed claim terms) (“*Hitkansut II*”).

The court withheld summary judgment with respect to Claims 1, 2, 6, and 11 because the remaining claims raised issues beyond subject-matter eligibility. *Id.* at 734 n.17.

On August 11, 2014, the government filed its second motion for summary judgment, alleging that the disclosed method of determining time and operational settings from a Larson-Miller relationship was inoperable due to the presence of several significant errors in the specification and claims and that Claims 1, 2, 6, and 11 were not enabled by the disclosure in the patent under 35 U.S.C. § 112. Def.'s Mot. at 1. Hitkansut responded by arguing that any errors in the specification and claims are trivial and insignificant and the disclosure regarding the claims is sufficient to satisfy the enablement requirement. Pls.' Opp'n at 12, 18-27.

Of the four remaining asserted claims, Claim 1 is an independent claim, on which Claims 2 and 6 depend. Claim 11 is a separate independent claim upon which no other claim depends.

STANDARDS FOR DECISION

Under RCFC 56, “[t]he court shall grant summary judgment if the movant shows that there is no genuine dispute as to any material fact and the movant is entitled to judgment as a matter of law.” RCFC 56(a). A fact is material if it “might affect the outcome of the suit under governing law;” an issue is genuine if it “may reasonably be resolved in favor of either party.” *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248, 250 (1986). The initial burden rests on the moving party to demonstrate the absence of any genuine issue of material fact. *Celotex Corp. v. Catrett*, 477 U.S. 317, 323 (1986). The moving party may relieve its burden by “pointing out . . . that there is an absence of evidence to support the nonmoving party’s case.” *Id.* at 325.

35 U.S.C. § 112 sets forth the enablement requirement as follows:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

35 U.S.C. § 112, Paragraph 1 (2006).³

Enablement poses a question of law based on underlying findings of fact. *Alcon*, 745 F.3d at 1188; *In re Vaeck*, 947 F.2d 488, 495 (Fed. Cir. 1991). The enabling disclosure must appear in the specification of the patent at the time of filing. *MagSil Corp. v. Hitachi Global Storage Technologies, Inc.*, 687 F.3d 1377, 1382 (Fed. Cir. 2012). A challenger to a patent’s validity based on a lack of enablement has the burden of proving by clear and convincing

³Paragraph 1 of 35 U.S.C. § 112 was replaced with newly designated § 112(a) by Subsection 4(c) of the Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112-29, 125 Stat. 296, and AIA Subsection 4(e) makes those changes applicable to any patent application filed on or after September 16, 2012. Because the ’722 patent’s application was filed before that date, the court will rely on the pre-AIA version of § 112. *See Alcon Research Ltd. v. Barr Labs., Inc.*, 745 F.3d 1180, 1183 n.1 (Fed. Cir. 2014).

evidence that a person of ordinary skill in the art would not be able to practice the full scope of the claimed invention without “undue experimentation.” *Alcon*, 745 F.3d at 1188 (citing *In re Wands*, 858 F.2d 731, 736-37 (Fed. Cir. 1988); *Johns Hopkins Univ. v. CellPro, Inc.*, 152 F.3d 1342, 1360 (Fed. Cir. 1998)); *see also In re Wright*, 999 F.2d 1557, 1561 (Fed. Cir. 1993).

Whether the required experimentation is “undue” is “not a single, simple factual determination, but rather is a conclusion reached by weighing many factual considerations.” *Wands*, 858 F.2d at 737. For a given case, the determination of what constitutes undue experimentation requires the application of a standard of reasonableness, with “due regard for the nature of the invention and the state of the art.” *Id.* (citing *Ansul Co. v. Uniroyal, Inc.*, 448 F.2d 872, 878-79 (2d Cir. 1971)). In *Wands*, the court of appeals set forth relevant factors that may be weighed in determining whether the amount of experimentation required is undue or sufficiently routine such that an ordinarily skilled artisan would reasonably be expected to complete it. *Alcon*, 745 F.3d at 1188 (citing *Wands*, 858 F.2d at 737).⁴ Those factors include:

- (1) the quantity of experimentation necessary,
- (2) the amount of direction or guidance presented,
- (3) the presence or absence of working examples,
- (4) the nature of the invention,
- (5) the state of the prior art,
- (6) the relative skill of those in the art,
- (7) the predictability or unpredictability of the art, and
- (8) the breadth of the claims.

Wands, 858 F.2d at 737.

In the patent system, enablement serves the dual purpose of “ensuring adequate disclosure of the claimed invention and of preventing claims broader than the disclosed invention.” *MagSil*, 687 F.3d at 1381 (citing *AK Steel Corp. v. Sollac & Ugine*, 344 F.3d 1234, 1244 (Fed. Cir. 2003)). To ensure adequate public knowledge, the scope of the enablement must be greater than or equal to the scope of the claims. *Id.*; *see also Sitrick v. Dreamworks, LLC*, 516 F.3d 993, 999 (Fed. Cir. 2008); *Automotive Technologies Int’l, Inc. v. BMW of N. Am., Inc.*, 501 F.3d 1274, 1281 (Fed. Cir. 2007). “[A] patent must be precise enough to afford clear notice of what is claimed, thereby apprising the public of what is still open to them. Otherwise there would be a zone of uncertainty which enterprise and experimentation may enter only at the risk of infringement claims.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, __ U.S. __, __, 134 S. Ct. 2120, 2129 (2014) (internal citations omitted).

ANALYSIS

A. Errors in the ’722 Patent

The government claims that the ’722 patent fails the enablement requirement in part because Claims 1, 2, 6, and 11 contain substantial errors, the identification and correction of

⁴The *Wands* factors are not mandatory, and a court may find a lack of enablement without an analysis of all eight factors. *See Cephalon, Inc. v. Watson Pharm., Inc.*, 707 F.3d 1330, 1336 (Fed. Cir. 2013).

which would require undue experimentation by a person of ordinary skill in the art. Def.'s Mot. at 9-15. Hitkansut concedes that the '722 patent contains errors, but insists that they ultimately are insignificant because persons of ordinary skill in the art, based on their education and experience, would be able to correct them and operate the protected process. Pls.' Opp'n at 10. In support of their position, Hitkansut offers the declarations of Dr. Robert H. Wagoner⁵ and the inventor, Ms. Walker, experts whom they claim qualify as persons of ordinary skill in the art. *Id.* at 9.⁶

In *PPG Indus., Inc. v. Guardian Indus. Corp.*, 75 F.3d 1558 (Fed. Cir. 1996), the Federal Circuit addressed the issue of errors in a patent as they relate to the statutory enablement requirement. In that case, the court held that the inventor's use of flawed testing equipment, which led to the belief that glass with a composition equal to that of the competitor's glass would not satisfy the patent's ultraviolet transmission limitation, did not prevent the patent from satisfying the enablement requirement. *Id.* at 1564. The court noted that undue experimentation

⁵Dr. Wagoner is Professor Emeritus of Materials Science and Engineering at Ohio State University. Pls.' Opp'n at Ex. D (Decl. of Dr. Robert H. Wagoner (Sept. 17, 2014)) ("Wagoner Decl.") at 1. From 1983 to 2013, he was the George K. Smith Chair and Professor in the Departments of Materials Science and Engineering and Mechanical Engineering at Ohio State University. *Id.*

⁶Both parties have submitted similar definitions of persons who qualify as those of ordinary skill in the relevant art. *Compare* Def.'s Claim Constr. Br. at 14-15, ECF No. 20, *with* Pls.' Opp'n at 11-12, *and* Wagoner Decl. at 4. Both sides agree that such a person would have at least a baccalaureate degree in materials science or engineering or in a related field, such as physics or physical chemistry, and "would also have some practical experience in working with solid materials." Def.'s Claim Constr. Br. at 15. The court in its enablement analysis may properly rely on the expert testimony of those of ordinary skill in the art. *See ALZA Corp. v. Andrx Pharm., LLC*, 603 F.3d 935, 942 n.8 (Fed. Cir. 2010) ("We find that the district court did not clearly err in crediting the testimony of [defendant's expert], whose analysis was based on the level of skill in the art that the court adopted.").

Notably, the government neglected to proffer any expert testimony on the issue of enablement. Instead, the government in its motion cited heavily to a deposition of Ms. Walker, the inventor of the process set forth in the '722 patent. However, as the government itself conceded, "the inventor's memory is irrelevant to answering a simple question about the primary exemplary embodiment described in [the '722] patent." Def.'s Mot. at 10-11. The court therefore declines to give weight to the deposition testimony of Ms. Walker in its assessment of whether the '722 patent meets the enablement requirement. *See generally Solomon v. Kimberly-Clark Corp.*, 216 F.3d 1372 (Fed. Cir. 2000) (holding that inventor testimony obtained in the context of litigation should not be used to invalidate issued claims under the second paragraph of 35 U.S.C. § 112); *Roton Barrier, Inc. v. The Stanley Works*, 79 F.3d 1112, 1126 (Fed. Cir. 1996) (noting in the context of claim construction, "[w]e have previously stated that an inventor's "after-the-fact testimony is of little weight compared to the clear import of the patent disclosure itself.") (quoting *North Am. Vaccine, Inc. v. American Cyanamid Co.*, 7 F.3d 1571, 1577 (Fed. Cir. 1993)); *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 985 (Fed. Cir. 1995), *aff'd*, 517 U.S. 370 (1996).

“is a matter of degree,” and relied on the district court’s finding that PPG’s calculation error was “harmless, inconsequential, and easily detectable by anyone who was skilled in the art of processing solar controlled glass.” *Id.* The court concluded that despite the errors, the patent taught those skilled in the art how to make and use the full scope of the claimed invention. *Id.*

In this case, the errors identified by the government in the ’722 patent are similar to those present in the patent at issue in *PPG*. The first error that the government identifies is the inclusion in the specification of incorrect calculations in the rows of Tables 1 and 2 corresponding to a time of “0.” Def.’s Mot. at 9-15 (referring to ’722 patent, col. 14, line 50 to col. 15, line 20).⁷ The government contends that these calculations are “nonsense” and would necessarily require significant recalculation by one skilled in the art. *Id.* at 10-11.⁸ However, as the government itself notes, Ms. Walker intended these rows to establish a baseline measurement, *id.* at 11, and the act of establishing a baseline is explicitly referenced in the patent’s specification, *see* ’722 Patent, col. 14, lines 15-18 (“A baseline stress measurement was taken on one of the halves.”). Use of a baseline is routine in experimentation, and Dr. Wagoner’s declaration indicates that one skilled in the art would recognize such rows as irrelevant to the plot trend reported in the ’722 patent and not rely on them in practicing the protected process. Wagoner Decl. at 6 n.2. Like the influence of the mistaken application of software in *PPG*, inclusion of the values corresponding to a time value of “0” is best categorized as a representational error easily detectable by one skilled in the art of materials processing.

The government also notes that the patent includes an incorrect value of the Larson-Miller constant “C” for aluminum. Def.’s Mot. at 9-10. The patent instructs use of a value for C of 10 instead of 20, the accepted standard constant for aluminum in the Larson-Miller equation. Pls.’ Opp’n at 14; Wagoner Decl. at 6 n.1. However, far from inhibiting the use of the claimed process, the error is typographical and would easily be understood and corrected by those of skill in the art who would have familiarity with commonly accepted values applicable to the Larson-Miller relationship. *See* Wagoner Decl. at 5-7.⁹ Use of the incorrect constant is even less significant than the errors that were present and found to be insignificant in *PPG*, which involved the application of flawed testing equipment that resulted in incorrect conclusions about ultraviolet transmissions. *See PPG*, 75 F.3d 1558.

Finally, the government asserts that the ’722 patent is characterized by incorrect and an inconsistent use of units for time and temperature, and the improper use of a natural logarithm

⁷Table 1 contains raw data used to construct the thermal Larson-Miller curve shown in Figure 4A. ’722 Patent, col. 14, lines 50-66.

⁸The patent incorporates the Larson-Miller relationship, the equation for which requires taking the log of “t,” *i.e.*, time. If time equals zero, the log is undefined and thus not meaningful. *See* Def.’s Mot. at 10 (citing Def.’s App. 251, Holliday, et al., *Algebra 2*, at 511 (Glencoe McGraw-Hill 2008) (explaining that the domain of logarithmic functions “is the set of all *positive* real numbers”) (emphasis added)).

⁹Similarly, the use of the capital letter “T” for time rather than the lower case “t” in Tables 1 and 2 is an insignificant typographical error. *See* Pls.’ Opp’n at 14.

rather than a base-10 logarithm in its application of the Larson-Miller relationship. Def.'s Mot. at 12-14, 27. Specifically, the government notes that the '722 patent does not instruct a person practicing the claimed method to use degrees Rankine for temperature "T" or to calculate time "t" in hours. The result of these errors is the incorrect calculation of the "final" combined Larson-Miller parameter P_f , allegedly rendering the claimed process inoperable. *Id.* at 14.¹⁰ While the government is correct that the patent contains unit errors, the court finds that any errors or omissions in the patent's specification with regard to units or the applicable type of logarithm are insignificant because of the patent's incorporation of the Larson-Miller relationship. The relationship first identified by Larson and Miller is considered fundamental and "taught in basic undergraduate engineering courses in metallurgy and material engineering." Pls.' Opp'n at 13; *see also* Wagoner Decl. at 5. Even in their original article outlining the relationship, Larson and Miller instructed that for a given stress, the time is related to temperature by the equation $P=T(20 + \log(t))$ where "t" is the time "in hours" and "T is the absolute temperature in (deg[rees] R[ankine])." *See* Pls.' Opp'n at Ex. J (F. R. Larson and James Miller, *A Time-Temperature Relationship for Rupture and Creep Stresses*, Transactions of the ASME, July 1952)). Those of skill in the art would be familiar with the proper units corresponding to the Larson-Miller relationship and would easily be able to recognize and correct any errors. Wagoner Decl. at 5. In fact, at the hearing held November 10, 2014, the government acknowledged that there is a way to correct each of the identified errors and make the patented process work for metals. Hr'g Tr. 25:3-7 (Nov. 10, 2014) (The question really isn't . . . there a way to make this process work. . . . There is a way to correct all the errors and to essentially make this work at least for metals."). Dr. Wagoner in his declaration explained that it took him approximately one hour to read and understand the patent and invention and to calculate, reproduce, and confirm the appropriate Larson-Miller parameters and operational settings described in the specification. Wagoner Decl. at 5-6.¹¹

In sum, while the '722 patent does contain representational errors and flaws in nomenclature, these errors are ultimately not significant because of the patent's incorporation of the Larson-Miller relationship, which is well understood and fundamental in the field of materials processing. A person of ordinary skill in the art would be able to correct the value of "C" for aluminum from 10 to 20, adjust the units of temperature "T" to degrees Rankine and the units of time "t" to hours, and apply a base-10 logarithm instead of a natural logarithm to the Larson Miller calculation. Wagoner Decl. at 5.¹² Because no undue experimentation would be necessary, the errors do not prevent the patent from enabling the protected process.

¹⁰The "final" Larson-Miller parameter, $P_f = P_v - P_t$ is required to solve the Larson-Miller relationship, $P_f = T(C + \log(t))$, where T is temperature, t is time, and C is a unitless constant that varies depending on the applicable material. *See* '722 Patent, col. 15, lines 45-48.

¹¹Dr. Wagoner in his declaration stated, "[T]he errors found in the '722 [p]atent should be considered isolated, insignificant, and narrow One of a high level of skill required in the art . . . would recognize these errors without *any* experimentation." Wagoner Decl. at 7 (emphasis added).

¹²In the patent prosecution process, counsel for Ms. Walker submitted a supplemental declaration by her dated April 3, 2006, transmitting additional experimental data. Pls.' Opp'n

*B. Enablement*¹³

The government argues that apart from the errors in the '722 patent, all eight *Wands* factors “strongly support the conclusion that undue experimentation would be required to practice [C]laims 1, 2, 6, and 11.” Def.’s Mot. at 16. The government first addresses the eighth *Wands* factor: the breadth of the claims. Specifically, the government contends that the breadth of Claims 1, 2, 6, and 11 exceeds the patent’s accompanying disclosure, requiring a person practicing the process to engage in undue experimentation to practice its full scope. *Id.* at 16-17. First, the government notes that the term “structure” in Claim 1 is overbroad, citing the court’s claim-construction ruling that “structure” means “a physical object that has been constructed or manufactured and to which the claimed invention is applied.” *Id.* (quoting *Hitkansut II*, 114 Fed. Cl. at 416). The government contends that the '722 patent’s disclosure only describes how to use the method with crystalline solids. *Id.* at 17. Similarly, the government argues that the reference in Claim 1 to “oscillatory” energy does not inherently limit “oscillatory” to apply only to an oscillatory source with mechanical vibrations, as described in the '722 patent’s disclosure. *Id.* at 17-18. The government also underscores the fact that Claim 11 does not limit itself to the requirement present in Claims 1, 2, and 6 that one of the two applied energies must be oscillatory while the other must be thermal. *Id.* at 18. Finally, the government states that Claims 1, 2, and 11 are overbroad because they encompass “changing a physical property” without restricting the applicable property to internal stress. *Id.* at 19.¹⁴

In raising its objection of a lack of enablement based on overbreadth of the patent claims, the government improperly relies on the deposition of the inventor, Ms. Walker, in identifying

Ex. F (Inventor Supplemental Decl.), ECF No. 91-7. Those data reflected stress relief tests on 4340 steel, using vibratory and thermal means. *Id.* at 19-23. The Larson-Miller equations were stated in terms of temperature “T” expressed in degrees Rankine and time “t” expressed in hours. The values for the constant “C” varied between 20 and 10. *Id.*

¹³In their briefing, plaintiffs also include arguments asserting that the claims in the '722 patent are not indefinite. Pls.’ Opp’n at 9-10. As the government noted in its reply brief and at the hearing held on November 10, 2014, the government did not raise any objection to the '722 patent claims on the ground of indefiniteness. Def.’s Reply in Support of Mot. for Summary Judgment of Invalidity of U.S. Patent No. 7,175,722 Pursuant to 35 U.S.C. § 112 at 2, ECF No. 93. The enablement and written-description requirements are separate and distinct. Hr’g Tr. 4:22 to 5:21 (Nov. 10, 2014); *see also Ariad Pharm., Inc. v. Eli Lilly & Co.*, 598 F.3d 1336, 1340 (Fed. Cir. 2010) (en banc). Likewise, the definiteness requirement, which arises under the second paragraph of Section 112, is distinct from the enablement requirement, which is set out in the first paragraph of Section 112. *See* 28 U.S.C. § 112 (2006). Only the issue of enablement has been put at issue by the government’s motion.

¹⁴Because the Larson-Miller relationship describes a time and temperature relationship for relieving creep stress and preventing catastrophic failure or rupture, the government asserts that if another property were to be altered by applying the protected process, the disclosure offers no guidance as to how the process should be modified, requiring one skilled in the art to fill in the gaps by engaging in undue experimentation. Def.’s Mot. at 19-20.

the proper boundaries that delineate the “full scope” of the ’722 patent. *See, e.g.*, Def.’s Mot. at 17 (“[W]hile the inventor claims that the process works on carbon structures, her testimony reveals that she did not discover as much until a couple of years ago”) (internal citation omitted); *id.* at 18 (“[A]ccording to the inventor’s understanding, any energy source could satisfy the oscillatory energy ‘limitation’ of [C]laim 1”). Nonetheless, it is not the inventor’s opinion, but rather the patent as understood by one of ordinary skill in the relevant art, that controls.

The government avers that “the invention embraces methods of changing any physical property of a structure without regard to the material the structure is made out of, or the particular manner by which energy is applied to effect that change.” However, the government’s assertion overstates the scope of the invention because the Larson-Miller relationship provides context for the ’722 patent. Def.’s Mot. at 35.¹⁵ That context inherently limits the types of materials to which the process can be applied and any potential physical properties affected by the process.¹⁶ That is the reason “structure” as used in the claims is construed to mean “a physical object that has been constructed or manufactured *and to which the claimed invention is applied.*” *Hitkansut II*, 114 Fed. Cl. at 416 (emphasis added). The claimed invention uniformly and consistently invokes the Larson-Miller relationship and thus a structure covered by the claims would necessarily have to be susceptible to being affected by operations conducted pursuant to the relationship. Other structures, *i.e.*, those not so affected, would be outside the coverage of the claims.

The government also argues that the first three *Wands* factors each support its position that the protected process is not enabled by the disclosure. Def.’s Mot. at 23-29. The government asserts that the specification of the ’722 patent fails to disclose, *inter alia*, (1) the types of energy that may be used in the process; (2) the suitability of a given energy type for each material; (3) the settings governing non-thermal energies used with the method; (4) the proper tuning process; and (5) a method for altering the Larson-Miller relationship to account for two energy processes that do not depend on temperature “T.” Additionally, the government argues that the single detailed example in the specification of how to use the claimed method provides inadequate guidance to those of ordinary skill in the art to apply the protected process. *Id.* at 27-29.

As the government acknowledges, “a specification need not disclose what is well-known in the art,” Def.’s Mot. at 32 (quoting *Strech, Inc. v. Research & Diagnostic Sys., Inc.*, 665 F.3d 1269, 1288 (Fed. Cir. 2012)), and where the applicable skill level is high, “it may be appropriate to infer that a person of ordinary skill already possesses a wide array of knowledge that need not be disclosed in the specification,” *id.* While the government categorizes the level of one of

¹⁵Moreover, the fact that claims might be broad is itself insufficient to invalidate a patent based on a lack of enablement. *See Ariad Pharm.*, 598 F.3d at 1359 (Newman, additional views) (“Indeed, pioneering inventions can receive broad patents, when shown to have broad scope.”).

¹⁶In his declaration, Dr. Wagoner explains that stress relief is a standard process that one of ordinary skill would associate only with metals and alloys because stress relief occurs by ameliorating dislocations, which appear in metals, alloys, and, rarely, in other crystalline solids such as ceramics. *See Wagoner Decl.* at 8.

ordinary skill in the art as “low,” *id.*, it acknowledges that a person of the requisite skill would have a background in metallurgy, material science, or engineering including two to three years of work in a laboratory and would therefore be familiar with the Larson-Miller relationship, which is typically taught in undergraduate engineering courses, *id.* at 33. As Dr. Wagoner stated in his declaration, despite the alleged omissions identified by the government, a person of ordinary skill in the art would be able to correct the minor errors in the ’722 patent, calculate the Larson-Miller parameters, calculate the operational settings in accordance with the specification, and recreate the Larson-Miller plots of Figures 2a and 2b of the specification in “an hour or less.” Wagoner Decl. at 7. He further declared, “[b]ased on the extent of the disclosure in the specification, not only is no undue experimentation required to practice the process set forth in the ’722 patent, but no experimentation at all is required to practice it. . . . All that is required is simple calculations and basic analysis, no experimentation.” *Id.* at 7-8. These circumstances are readily distinguishable from those encountered in decisions finding lack of enablement because of a need for extensive experimentation. *See ALZA Corp.*, 603 F.3d 941 (holding that claims failed for lack of enablement where plaintiff conceded that even with the guidance provided in the specification, a person of ordinary skill in the art would be “required to engage in an iterative, trial-and-error process to practice the claimed invention”); *see also White Consol. Indus., Inc. v. Vega Servo-Control, Inc.*, 713 F.2d 788, 790-92 (Fed. Cir. 1983) (finding that a requirement of 18 months to 2 years’ work to practice the patented invention is “undue experimentation”); *cf. PPG*, 75 F.3d at 1565 (quoting *In re Ghiron*, 442 F.2d 985, 992 (C.C.P.A. 1971) (a development period of “many months or years . . . does not bespeak a routine operation but of extensive experimentation and development work”)). Dr. Wagoner’s testimony indicates that the disclosures identified by the government are not necessary to practice the claimed process because any missing information is provided by the incorporation of the Larson-Miller relationship.

Finally, the government argues that the ’722 patent is not enabled based on the state of the prior art. According to the government, because the concurrent application of heat and vibration to relieve stress was well known prior to the inventor’s application for the ’722 patent, “whatever novelty exists in the ’722 [p]atent inures from the method it describes for calculating time and temperature values according to a L[arson]-M[iller] relationship.” Def.’s Mot. at 29.¹⁷ The government’s depiction of the prior art as it existed at the time of Ms. Walker’s application is not persuasive insofar as enablement is concerned. While other patents in existence at the time of the ’722 patent’s filing combined heat and vibration to alter residual stress, the ’722 process was the first to use Larson-Miller relationships to select times and temperatures in concurrently applying two energy sources to accelerate or enhance physical changes in certain materials. That is the novelty of Ms. Walker’s invention. *See* Pls.’ Opp’n at 24.

In sum, the court finds that the government has failed to demonstrate that Claims 1, 2, 6, and 11 are not enabled by the disclosure of the ’722 patent.

¹⁷The government identifies three patents, U.S. Patent No. 3,999,276; U.S. Patent No. 5,252,152; and U.S. Patent No. 6,223,974 in this regard. Def.’s Mot. at 30-31. These patents are included in the list of references cited in the ’722 patent, and each of them combines vibrations and heat to alter residual stress.

C. The Validity of Claim 2

The government also avers that Claim 2 of the '722 patent is invalid under 35 U.S.C. § 112, Paragraph 4 (2006) because it does not specify a further limitation of the subject matter disclosed in Claim 1, the independent claim upon which it depends. Def.'s Mot. at 36.¹⁸ Plaintiffs counter by noting that Claim 2 contains language referring to a "Larson[-]Miller parameter" and a "second one" of a temperature setting or time value which are not mentioned in Claim 1. Pls.' Opp'n at 27.

Although slightly different language appears in Claim 1, Claim 2 essentially restates a process already addressed in Claim 1. Claim 2 reads:

The method of claim 1, further comprising:

determining a first Larson Miller parameter according to the first Larson Miller relationship, the first Larson Miller parameter corresponding to the desired physical property value;

determining a second Larson Miller parameter according to the second Larson Miller relationship, the second Larson Miller parameter corresponding to the desired physical property value;

selecting a first one of the temperature setting and the time value;

selecting a second one of the temperature setting and the time value according to the first and second Larson Miller parameters, according to the first Larson Miller relationship, and according to the first one of the temperature setting and the time value.

'722 Patent, col. 20, lines 17-32.

Each of the limitations listed in Claim 2 are addressed in the independent claim. For example, Claim 1 similarly requires selection of a temperature setting or time value "according to a first order rate relationship for the first energy process, according to a first order rate relationship for a second energy process, and according to a desired physical property value"

¹⁸The cited portion of Section 112 states

[A] claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.

35 U.S.C § 112, Paragraph 4 (2006).

and limits such first order rate relationships to Larson-Miller relationships. '722 Patent, col. 19, lines 48-51. In addition, instructions regarding the determination of the first and second Larson-Miller parameters are outlined in the patent's specification. *Id.*, col. 13, line 50 to col. 16, line 31. Rather than specifying a further limitation beyond those incorporated in Claim 1, Claim 2 recites limitations already required by that claim. Accordingly, the court finds that Claim 2 is invalid under 35 U.S.C. §112, Paragraph 4 (2006). *See Pfizer, Inc. v. Ranbaxy Labs Ltd.*, 457 F.3d 1284, 1291-92 (Fed. Cir. 2006).

CONCLUSION

For the reasons stated, defendant's motion for summary judgment of invalidity with respect to Claims 1, 6, and 11 is DENIED. Defendant's motion for summary judgment of invalidity with respect to Claim 2 is GRANTED.

It is so ORDERED.

s/ Charles F. Lettow

Charles F. Lettow

Judge